

**REMARKS**

Claims 26-29 have been amended. Claims 36 and 43 have been canceled without prejudice or disclaimer.

It is respectfully submitted that the present amendment presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the above amendments and the following remarks is requested.

**I. The Rejection of Claims 26-29 under 35 U.S.C. 112**

Claims 26-29 are rejected under 35 U.S.C. 112 as indefinite. The Examiner indicates that the metes and bounds of the phrase "corresponding to" as used in claims 26-29 is not clear.

As amended, claims 26-29 are clarified and render this rejection moot.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 112. Applicants respectfully request reconsideration and withdrawal of the rejection.

**II. The Rejection of Claims 25-30, 36, 43, 50, 57, 58 under 35 U.S.C. 112 (Enablement Requirement)**

Claims 25-30, 36, 43, 50, 57, 58 are rejected under 35 U.S.C. 112, paragraph 1, as lacking enablement. The Examiner states that the specification, while enabling for a variant alpha amylase enzyme of SEQ ID NO:12 wherein the variant comprises an alteration selected from the group of alterations to amino acids at positions 118, 320 or 458 and wherein the alteration specifically comprises replacing the amino acid at said positions with lysine (K), does not reasonably provide enablement for a variant amylase enzyme wherein the variant comprises a polypeptide having at least 80%, 90%, 95% or 97% homology with SEQ ID NO: 12. The Examiner further states that the specification "provides no guidance with regard to the making of variants and mutants that are 80% to 97% identical to SEQ ID NO:12."

The rejection appears concerned with whether an artisan would be able to practice the claimed invention without undue experimentation. The determination of what is needed to support generic claims to biological subject matter depends on a variety of factors, such as the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, the predictability of the aspect at issue, and other considerations appropriate to the subject matter. See *Capon v. Esshar*, 418 F.3d 1349 (Fed. Cir. 2005). It is not necessary that every permutation within a generally operable invention be effective in order for an inventor to obtain a generic claim, provided that the effect is sufficiently demonstrated to characterize a generic invention. *Id.*

The claims are directed to variants of the alpha amylase of SEQ ID NO:12 that have a high degree of homology with SEQ ID NO:12. See specification at page 10, lines 4-26. The specification discloses several specific working examples of numerous alpha amylases which are at least 80% homologous to SEQ ID NO:12. See Example 8. The specification also provides detailed guidance for identifying suitable amino acid modifications on other variants. See, for example, the specification at page 26, line 12 to page 28, lines 30-33. For example, the specification provides for a method for providing alpha amylase variants with altered properties relative to the parent alpha amylase. See, for example, the specification at page 26, lines 12-29. The specification discloses specific methods for designing alpha amylase variants using the three-dimensional structure of a parent alpha amylase. See, for example, the specification at page 28, lines 24-33.

As of the time of the invention, the art of alpha-amylases, in particular, alpha-amylase related to the claimed alpha-amylases, was very well-developed, and it included significant guidance as to suitable alterations as well as important conserved sequences. These include the alpha-amylase variants described in, e.g., U.S. patent nos. 6,093,562, 5,989,169, 6,143,708, and 6,204,232.

In addition to the Appendix 1, there were also many relevant alpha-amylase (e.g., "Termamyl-like") crystal structures available in the art as of the time of the invention which would be useful to identify which residues should be conserved as important for catalytic activity, calcium binding and maintaining the structure of the enzyme. See, e.g., WO 96/23874 (corresponding to U.S. Patent No. 5,989,169).

Thus, based on the existing knowledge in the particular field, the extent and content of the prior art, and the maturity of the relevant science or technology, it would be routine for one of ordinary skill in the art to practice the full scope of the invention using methods well known in the art. Moreover, in order to expedite prosecution, the claims have been amended to recite a homology of 90%.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 112. Applicants respectfully request reconsideration and withdrawal of the rejection.

### **III. The Rejection of Claims 25, 27, 30, 36 under 35 U.S.C. 102**

Claims 25, 27, 30, 36 are rejected under 35 U.S.C. 102(b) as anticipated by Igarashi et al. The Examiner states that claims 25, 27, 30, 36 of the present application are drawn to a variant amylase polypeptide wherein said variant has the amino acid K corresponding to position 320 and

wherein said peptide is at least 80% identical to SEQ ID NO: 12. The Examiner further states that Igarashi et al. anticipates claims 25, 27, 30, 36 because Igarashi et al. discloses a polypeptide that is 89% identical to SEQ ID NO:12 comprising the amino acid K at a position corresponding to position 320 of SEQ ID NO:12. See July 18, 2005 Officer Action at pages 8-9. This rejection is respectfully traversed.

The present application is directed to variants (i.e., non-naturally occurring) of parent alpha amylases comprising a substitution of a K at an amino acid position selected from the group consisting of 118, 320 and 458. Igarashi et al., on the other hand, is directed to a wild-type (i.e., naturally occurring) alpha amylase with a K at position 320. Igarashi et al. is not directed to alpha amylase variants; and Igarashi et al. does not disclose an alpha amylase *variant* with an alteration comprising a substitution of the amino acid lysine at position 320. As amended, the claims clarify that the variants are non-naturally occurring. Thus, Igarashi et al. does not anticipate the present invention.


For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 102(b). Applicants respectfully request reconsideration and withdrawal of the rejection.

#### IV. Conclusion

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Respectfully submitted,

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